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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,462	03/24/2006	Takuya Kinoshita	NNA-241-B	2578

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EXAMINER	
CULLEN, SEAN P	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
01/13/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/573,462	KINOSHITA ET AL.	
	Examiner	Art Unit	
	Sean P. Cullen	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claim 14 is rejected under 35 U.S.C. 102(b) as being anticipated by Hisamitsu et al. (. Regarding claim 14, Hisamitsu et al. discloses a vehicle (801) comprising:

- a controller (see unit cell controller, [0147); and
- an assembled bipolar battery (800) comprising
    - a plurality of bipolar battery cells (see plurality of bipolar batteries, [0148]), wherein each bipolar battery cell (see stack type battery, abstract) comprises:
        - a plurality of electric cells having
            - a bipolar electrode (30) including
            - a collector (31) having
                - a positive-electrode layer (32) on one surface and
                - a negative-electrode layer (33) on another surface (Fig. 3);
            - a plurality of electrolyte layers (40) that exchange ions between the positive-electrode layer (32) and the negative electrode layer (33, [0079]) and
            - a discharge circuit (50) that electrically balances charged conditions of adjacent bipolar electrodes [0006],

- wherein the discharge circuit (50) is provided on the same surface (10-18, Fig. 3) of at least one layer of the **positive-electrode layers** (32), the **negative-electrode layers** (33), or the electrolyte layers.

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-2, 5-13 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (U.S. 2001/0019794) in view of Hisamitsu et al. (U.S. 2004/0038123).

Regarding claim 1, Horie et al. discloses a bipolar battery cell (see cell group of a battery, abstract) comprising:

- a plurality of electric cells (9, Fig. 9A) comprising:
  - a bipolar electrodes (Fig. 4A), each including
    - a collector (7) having
      - a positive-electrode layer (2) on one surface and
      - a negative-electrode layer (3) on another surface (Fig. 4B);
  - a plurality of electrolyte layers (5) that exchange ions between the positive-electrode layer and the negative electrode layer (see conductive ion layer, Fig. 4A-B); and
  - a discharge circuit (1) is provided within each electric cell (Fig. 4B)

- that electrically senses charged conditions (see the battery state sensing apparatus can prevent such a phenomenon that the discharge of the battery is continued, [0062]; see excessive charge and the excessive discharge can be sensed) of adjacent bipolar electrodes (2 and 3, Fig. 5A-B).

Horie et al. does not explicitly disclose:

- a discharge circuit that electrically balances charge conditions

Hisamitsu et al. discloses a bipolar battery cell (see stack type battery, abstract) comprising a discharge circuit (50) that electrically balances charged conditions of adjacent bipolar electrodes (30, [0006]) to prevent the deterioration of the lifetime of a stack type battery [0005]. Horie et al. and Hisamitsu et al. are analogous art because they are directed to stack type batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of Horie et al. with the balancing charged conditions of adjacent bipolar electrodes of Hisamitsu et al. to prevent the deterioration of the lifetime of a stack type battery.

Regarding claim 2, modified Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (1) is provided on the same surface of at least one layer of the positive-electrode layers (2), the negative-electrode layers (3), or the electrolyte layers (5, Fig. 1).

Regarding claim 5, modified Horie et al. discloses all claim limitations set forth above, but does not explicitly disclose a bipolar battery cell:

- wherein the discharge circuit includes a zener diode layer.

Hisamitsu et al. discloses a bipolar battery cell comprising a discharge circuit (50) including a zener diode layer (52) to prevent the overcharging of the unit cell [0124]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of modified Horie et al. with the zener diode layer of Hisamitsu et al. to prevent the overcharging of the unit cell.

Regarding claim 6, modified Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (1) includes a luminescent device (see luminescent element, Fig. 1).

Regarding claim 7, modified Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- further comprising a light guiding device (12) arranged between the luminescent device (11) and an end of the battery cell (Fig. 8).

Regarding claim 8, modified Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- further comprising a light sensor (4) that responds to light emitted from the relevant luminescent device (11, [0065]).

Regarding claim 9, modified Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit (1) includes a constant current circuit (20, Fig. 9A).

Regarding claim 10-12, modified Horie et al. discloses all claim limitations set forth above, but does not explicitly disclose a bipolar battery cell:

- further comprising a sheathing material that covers and seals the bipolar electrodes, the electrolyte layers, the discharge circuit, and the light sensor.
- further comprising a sheathing material that covers and seals the bipolar electrodes, the electrolyte layers, and the discharge circuit.
- further comprising a conductive sealing material.

Hisamitsu et al. discloses a sheathing material (45) that covers and seals bipolar electrodes (30), electrolyte layers (40), and discharge circuit (50, [0050]) further comprising a conductive sealing material (45, see aluminum, stainless steel, nickel and copper, [0050]) to prevent impact from the outside and an environmental degradation during use of the bipolar battery [0050]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of modified Horie et al. with the sheathing material of Hisamitsu et al. to prevent impact from the outside and an environmental degradation during the use of the bipolar battery.

Regarding claim 13, Horie et al. discloses an assembled battery (Fig. 4B) comprising:

- a plurality of bipolar battery cells (Fig. 4B),
- wherein each bipolar battery cell (see cell group of a battery, abstract) comprises:
    - a plurality of electric cells (9) each having:
    - a laminated bipolar electrodes (Fig. 4B, [0048]) including
        - a collector (7) having
            - a positive-electrode layer (2) on one surface and
            - a negative-electrode layer (3) on another surface (Fig. 4A-B);

- a plurality of electrolyte layers (5) that exchange ions between the positive-electrode layer and the negative electrode layer (see conductive ion layer, Fig. 4A-B); and
- a discharge circuit (1) that electrically senses charged conditions (see the battery state sensing apparatus can prevent such a phenomenon that the discharge of the battery is continued, [0062]; see excessive charge and the excessive discharge can be sensed) of adjacent bipolar electrodes (2 and 3, Fig. 5A-B).
- wherein the discharge circuit (1) is provided on the same surface of at least one layer of the positive-electrode layers (2), the negative-electrode layers (3), or the electrolyte layers (5, Fig. 1).

Horie et al. does not explicitly disclose:

- a discharge circuit that electrically balances charge conditions

Hisamitsu et al. discloses a bipolar battery cell (see stack type battery, abstract) comprising a discharge circuit (50) that electrically balances charged conditions of adjacent bipolar electrodes (30, [0006]) to prevent the deterioration of the lifetime of a stack type battery [0005]. Horie et al. and Hisamitsu et al. are analogous art because they are directed to stack type batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of Horie et al. with the balancing charged conditions of adjacent bipolar electrodes of Hisamitsu et al. to prevent the deterioration of the lifetime of a stack type battery.

Regarding claim 15, Horie et al. discloses a method of forming a bipolar battery cell (see cell group of a battery, abstract) each bipolar battery cell (see cell group of a battery, abstract) comprising a plurality of electric cells (9) comprising:

- laminating [0048] a bipolar electrodes (Fig. 4B) including
    - a collector (7) having
        - positive-electrode layer (2) on one surface and
        - a negative-electrode layer (3) on another surface (Fig. 4B);
- with [0048] an electrolyte layer (5) that exchange ions between the positive-electrode layer and the negative electrode layer (see conductive ion layer, Fig. 4A-B); and
- laminating [0048] a discharge circuit (1) that electrically senses charged conditions (see the battery state sensing apparatus can prevent such a phenomenon that the discharge of the battery is continued, [0062]; see excessive charge and the excessive discharge can be sensed) of adjacent bipolar electrodes (2 and 3, Fig. 5A-B).

Horie et al. does not explicitly disclose:

- a discharge circuit that electrically balances charge conditions

Hisamitsu et al. discloses a bipolar battery cell (see stack type battery, abstract) comprising a discharge circuit (50) that electrically balances charged conditions of adjacent bipolar electrodes (30, [0006]) to prevent the deterioration of the lifetime of a stack type battery [0005]. Horie et al. and Hisamitsu et al. are analogous art because they are directed to stack type batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of

the invention to make the bipolar battery cell of Horie et al. with the balancing charged conditions of adjacent bipolar electrodes of Hisamitsu et al. to prevent the deterioration of the lifetime of a stack type battery.

Regarding claim 16, modified Horie et al. discloses all claim limitations set forth above and further discloses a method:

- wherein the discharge circuit (1) is provided on the same surface of at least one layer of the positive-electrode layers (2), the negative-electrode layers (3), or the electrolyte layers (5, Fig. 1).

Regarding claim 17, Horie et al. discloses a bipolar battery cell (see cell group of a battery, abstract) comprising:

- a plurality of electric cells (9), each electric cell (9) comprising:
  - a bipolar electrode (Fig. 4B) including
    - a collector (7) having
      - a positive-electrode layer (2) on one surface and
      - a negative-electrode layer (3) on another surface (Fig. 4B);
  - a means for exchanging ions between the positive-electrode layer and the negative electrode layer (5, see conductive ion layer, Fig. 4A-B); and
  - a means for sensing the bipolar battery cell (1) by electrically senses charged conditions (see the battery state sensing apparatus can prevent such a phenomenon that the discharge of the battery is continued, [0062]; see excessive charge and the excessive discharge can be sensed) of adjacent bipolar electrodes (2 and 3, Fig. 5A-B).

Horie et al. does not explicitly disclose:

- a means for balancing that electrically balances charge conditions

Hisamitsu et al. discloses a bipolar battery cell (see stack type battery, abstract) comprising a discharge circuit (50) that electrically balances charged conditions of adjacent bipolar electrodes (30, [0006]) to prevent the deterioration of the lifetime of a stack type battery [0005]. Horie et al. and Hisamitsu et al. are analogous art because they are directed to stack type batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of Horie et al. with the balancing charged conditions of adjacent bipolar electrodes of Hisamitsu et al. to prevent the deterioration of the lifetime of a stack type battery.

Regarding claim 18, modified Horie et al. discloses all claim limitations set forth above and further discloses a bipolar battery cell:

- wherein the discharge circuit comprises an abnormal voltage detecting circuit (4 and 12) and a voltage balancing circuit (20).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (U.S. 2001/0019794) in view of Hisamitsu et al. (U.S. 2004/0038123) as applied to claim 1 above.

Regarding claim 3, modified Horie et al. discloses all claim limitations set forth above, but does not explicitly disclose a bipolar battery cell:

- a contact area between the discharge circuit and the bipolar electrode that is more than 0.06 mm^2 per battery capacity of the bipolar battery 1 Ah.

As the size of the opening for the discharge circuit and thickness of discharge circuit are variables that can be modified, among others, by adjusting the contact area between the discharge circuit and the bipolar electrode, with the opening for the discharge circuit increasing and the thickness of the discharge circuit decreasing as the contact area is increased, the contact area would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed contact area cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the contact area in the bipolar battery cell of modified Horie et al. to obtain the desired balance between the size of the opening of the discharge circuit and the thickness of the discharge circuit (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (U.S. 2001/0019794) in view of Hisamitsu et al. (U.S. 2004/0038123) as applied to claim 1 above, in view of Einthoven et al. (U.S. 2003/0205775).

Regarding claim 4, modified Horie et al. discloses all claim limitations set forth above, but does not explicitly disclose a bipolar battery cell:

- wherein a threshold of a discharge voltage in the discharge circuit is set between 3.6 V-4.1 V, and

Hisamitsu et al. discloses a bipolar battery wherein a threshold of a discharge voltage in the discharge circuit (50) is set between 3.6 V-4.1 V (see 4.0 V, [0124]) to prevent damage to the unit cell [0124]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of modified Horie et al. with the zener diode of Hisamitsu et al. to prevent damage to the unit cell.

Modified Horie et al. does not explicitly disclose:

- wherein a doping concentration is set between 10^{17}-10^{18} cm^{-3}, and
- the thickness of a depletion layer is set between 0.1 μm-1.0 μm so as to set a breakdown voltage of a PN-junction of the discharge circuit the same as to the threshold.

Einthoven et al. discloses a voltage suppression device (abstract) with a doping concentration 10^{17}-10^{18} cm^{-3} (see 2 x 10^{17}-2 x 10^{18} cm^{-3}, [0051]) and the thickness of a depletion layer is set between 0.1 μm-1.0 μm (see 0.2 μm, [0035]) to control the breakdown voltage of the device [0048]. Horie et al. and Einthoven et al. are analogous art because they are directed to voltage suppression devices (solid state semiconductor). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bipolar battery cell of modified Horie et al. using the voltage suppression device of Einthoven to control the breakdown voltage.

Response to Arguments

5. Applicant's arguments filed November 6, 2009 with respect to the rejection of claim 14 under 35 U.S.C. §102(b) with Hisamitsu et al. (U.S. 2004/0038123) have been fully considered but they are not persuasive.

Regarding applicant's argument that Hisamitsu et al. does not disclose a discharge circuit provided within each electric cell that electrically balances charged condition of adjacent bipolar electrodes, it is noted that the features upon which applicant relies (i.e., a discharge circuit provided within each electric cell) are not recited in the rejected claim(s). Amended claim 14 recites "wherein the discharge circuit is provided on the same surface of at least one layer of the positive-electrode layers, the negative-electrode layers, or the electrolyte layers. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

6. Applicant's arguments with respect to claims 1-13 and 15-17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean P. Cullen whose telephone number is 571-270-1251. The examiner can normally be reached on Monday thru Thursday 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. P. C./
Examiner, Art Unit 1795

/Robert Hodge/

Primary Examiner, Art Unit 1795